

# Analysis and Development of Relationship for Tool Force and Tool Stress in end Milling Cutter by using Analytical Method

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**Abstract:** *Short tool life and rapid wear during micromachining of hard-to-machine materials present challenges to process efficiency. This study investigates the influence of key parameters—cutting speed, feed rate, and depth of cut—on tool life during end milling. A real-time simulation and numerical analysis were performed, and results were validated through experiments on sample specimens. Strong agreement was observed between the predicted and actual results, facilitating the development of a predictive model correlating experimental and analytical outcome..*

**Keywords:** Tool Force, End Milling, Numerical Analysis, Tool Stress, Real-Time Simulation.

